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A common language for Quality Measurements

Background

No single standard exists today to address Quality measurement for Variable, Binary and Attribute data, across the whole of Industry.

Everyone who is intimate with Quality measurement recognizes the incredible waste and redundancy of constant data re-integration.

No one is willing to give up any existing capability they already have, to embrace someone else's "least common denominator" data schema – (regardless of whatever standards organization endorses it.)

“Incredible Waste”

Gage and reporting solution providers are *consumed* with integrating data to suit limitless customer requirements.

(One source alone is supporting over 1500 separate integration schemes today)

. . . Recognizing the need - a Team was created to assess the practicability of creating a new Standard for Quality measurement . . .

Varied participants, arriving at . . .

AIAG

ASI DataMyte

Carl Zeiss IMT Corporation

Cognitens, Inc.

DaimlerChrysler

Data Net Quality Systems

Dimensional Control Systems

Ford

General Dynamics Land Systems

General Motors

GMPT

Honeywell

LMI Corporation

Marposs

Minitab Inc

Mitutoyo

NIST

Precision Gage

Q-DAS

UGS

ONE CONCLUSION:

The creation of a Quality Measurement standard is practicable, because:

1) Virtually every data element in every commercial Quality measurement schema the world-over is a pseudonym for another. Eg:

Characteristic
Part
Element
Trait
Attribute
Component
Condition
Feature
Property
Aspect

2) Advancements in technology (Web services, XML) make it easy to stream standardized data into existing Reporting Enterprises

3) The scope of Quality measurement is limited, and the scope of our mission is limited to just Quality measurement.

ONE MISSION:

"Create a simple, flexible and generic XML Standard for the export of Variable, Attribute and Binary Quality Measurements, from any source"

Next we underscored the objectives of a successful "Industrial" Quality Measurement Standard:

Expansive enough to accommodate existing data collection enterprises. ("No Enterprise left behind")

Inclusive, with a low price of admission for even the 'dumb' gages / data sources. . . But with capability for the most sophisticated quality enterprises.

Extensible, as the need might arise to accommodate new data sources and without the need to go back to committee.

Totally Database-schema and Gage independent (NON-proprietary, and equally-applicable to Dairy farms or Aero-Space)

But we knew we needed more than platitudes to hand-off to a technical/ implementation team. . .

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- So we began work on “a common lexicon”, and a plan for a flexible framework that would meet the aforementioned underscored objectives.

(This precursory work would enable the technical team to quickly develop the new Standard - and deliver true-to-intent.)

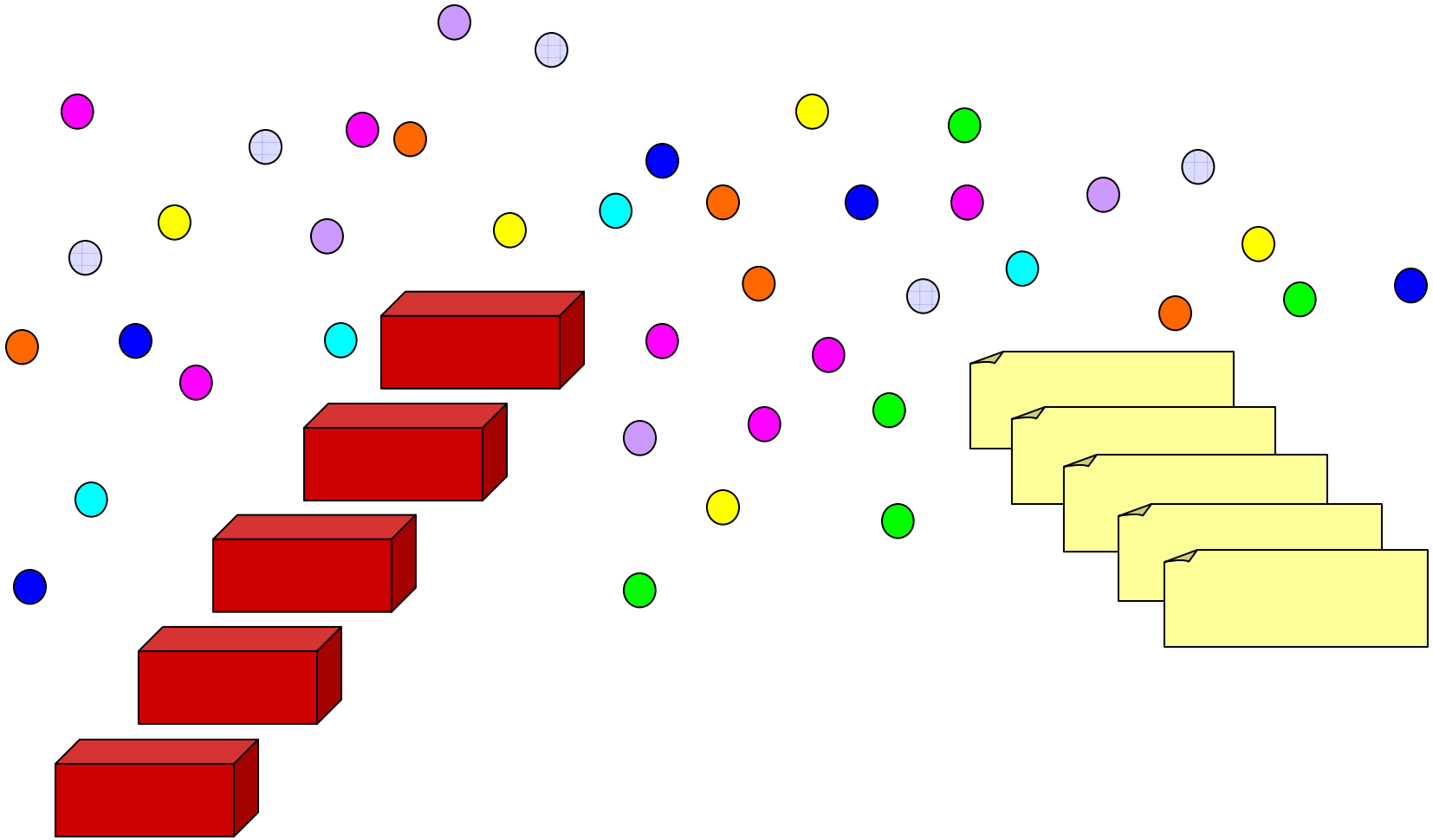
Toward enabling the Technical Implementation Team . . .

1) We synthesized some ~600 disparate data elements (“nouns”) currently used by Mitutoyo, ASI-DataMyte, and Q-DAS, to service 10’s of thousands of industrial customers in various data collection activities, world-wide.

2) We described a flexible framework, building upon on the concepts of “Conformance Classes” and “Catalogs”

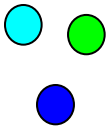
3) We identified and distributed every essential data element into newly-defined “Conformance Classes” and “Catalogs” and detailed their essential recursive (and associative) structures.

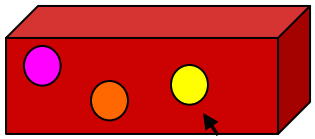
“Identify and distribute every essential data element into newly-defined Conformance Classes and “Catalogs”

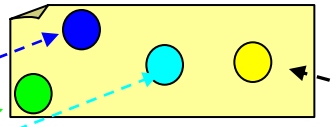


Early observations:

Not Every Data Element will to belong to a Conformance Class







Many Data elements will to belong to Catalogs

. .

. . . And some will belong to both !

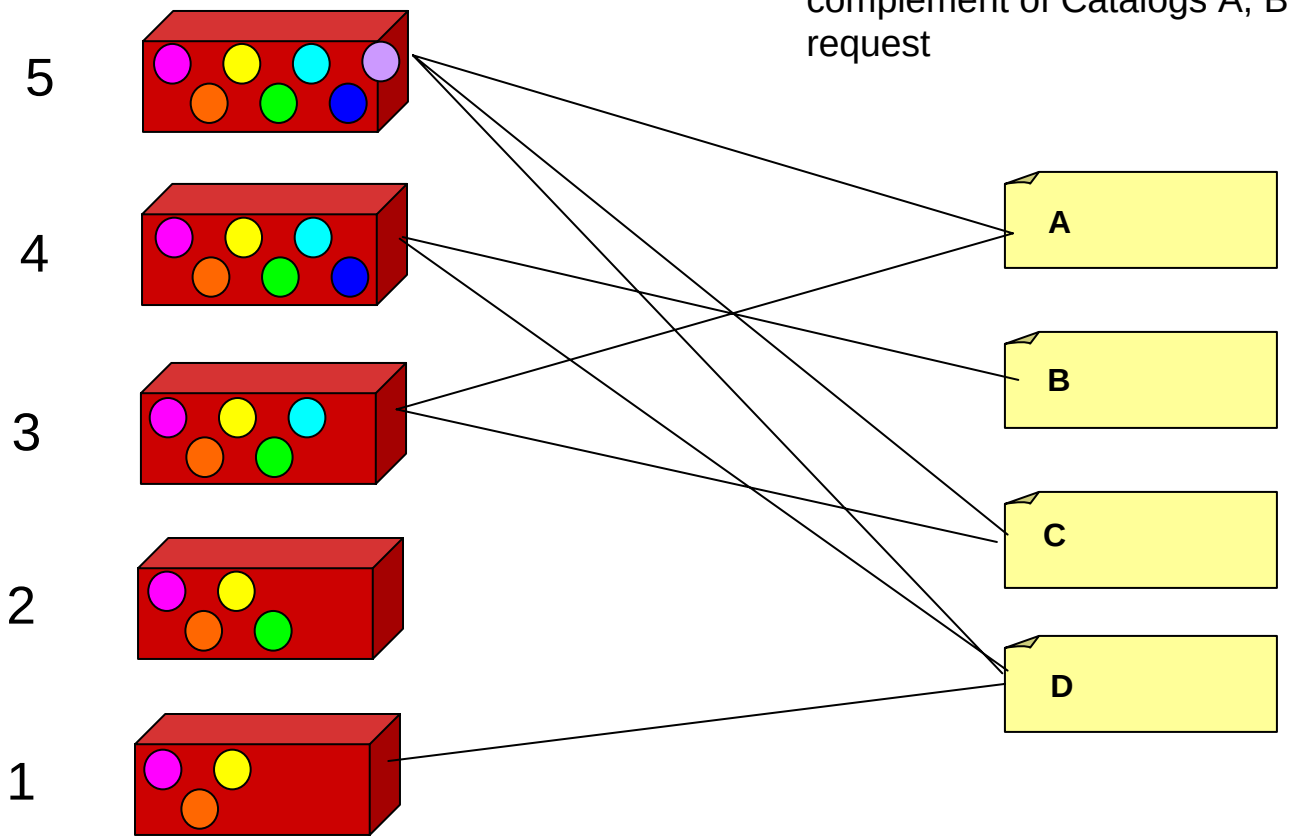
Conformance Classes – Mandatory:

"Conformance" requires that the Data Source be capable* of exporting all elements belonging to that Class. Each Class contains all elements from lower classes

Catalogs – Optional.

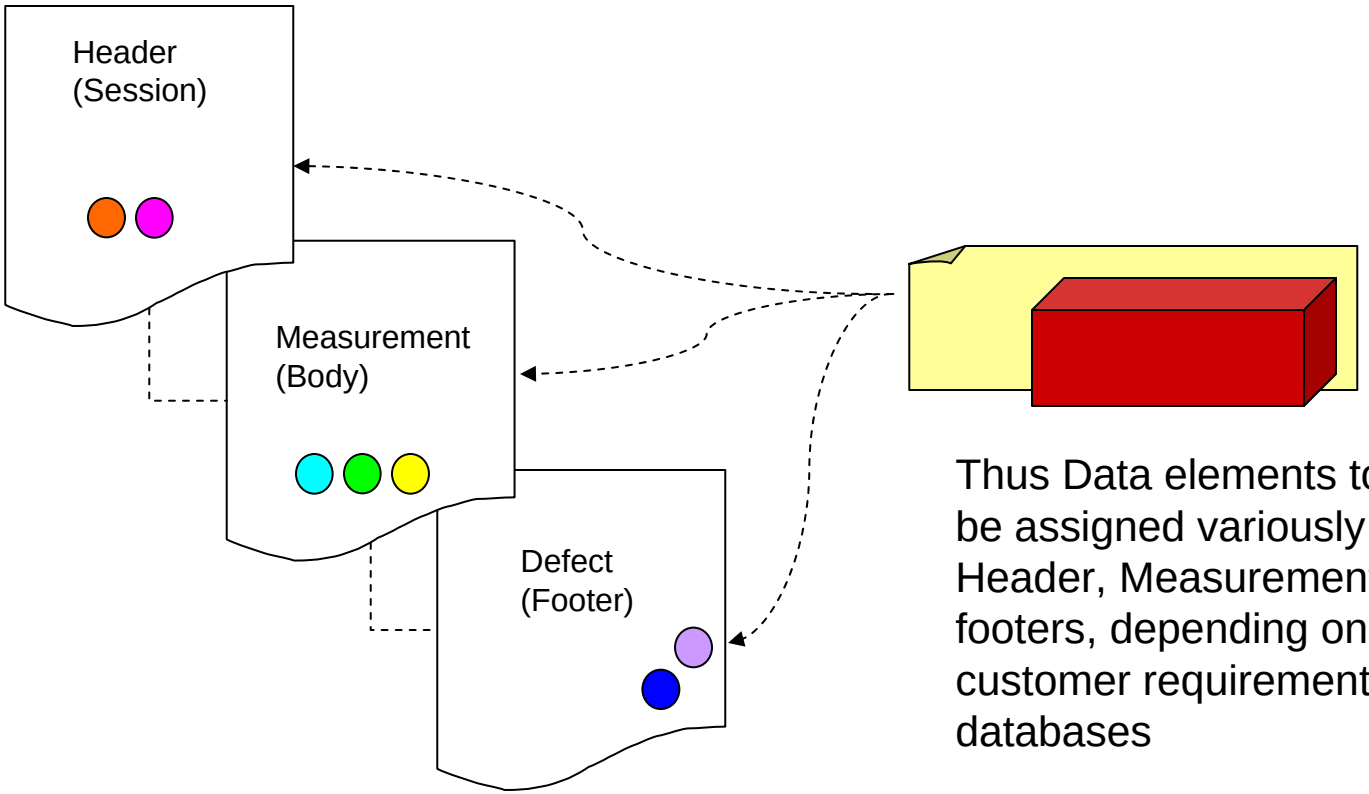
Any Catalog can associate with any Conformance Class

Thus a gage provider of a Conf Class "5" or "3" or even "1" gage could offer his customers a complement of Catalogs A, B & C etc, upon request



* "Capability" for the source infers that the customer can opt-out of receiving any selected elements in the output string

Catalogs & Conformance Classes can be associated at a Header, Measurement or Defect level



Thus Data elements too can be assigned variously to Header, Measurements or footers, depending on customer requirements / databases

This provides unlimited database flexibility for peculiar customer needs, even within a common lexicon

Catalog Generic Types are defined by the Standard:

“Traceability”

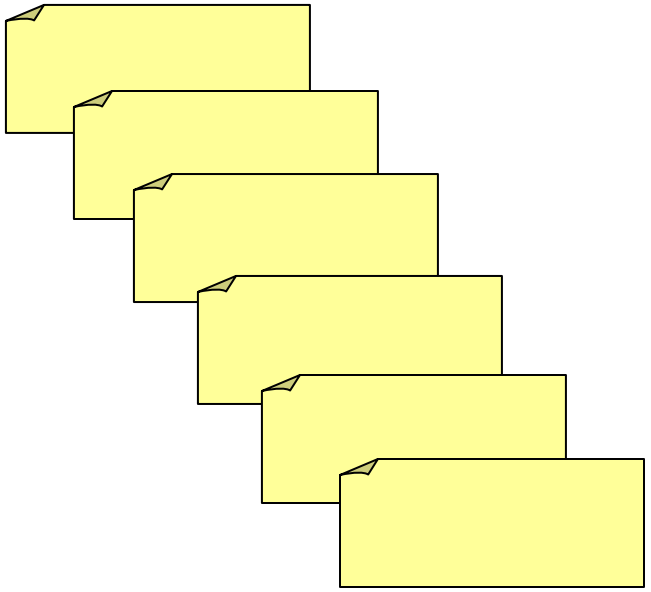
“Gage”

“Derived Value”

“Measurement”

“Set-up”

“R&R”



Catalog Names are Standard Tags

<Traceability Catalog>

That contain Standard strong “parent” noun names like

<Customer>

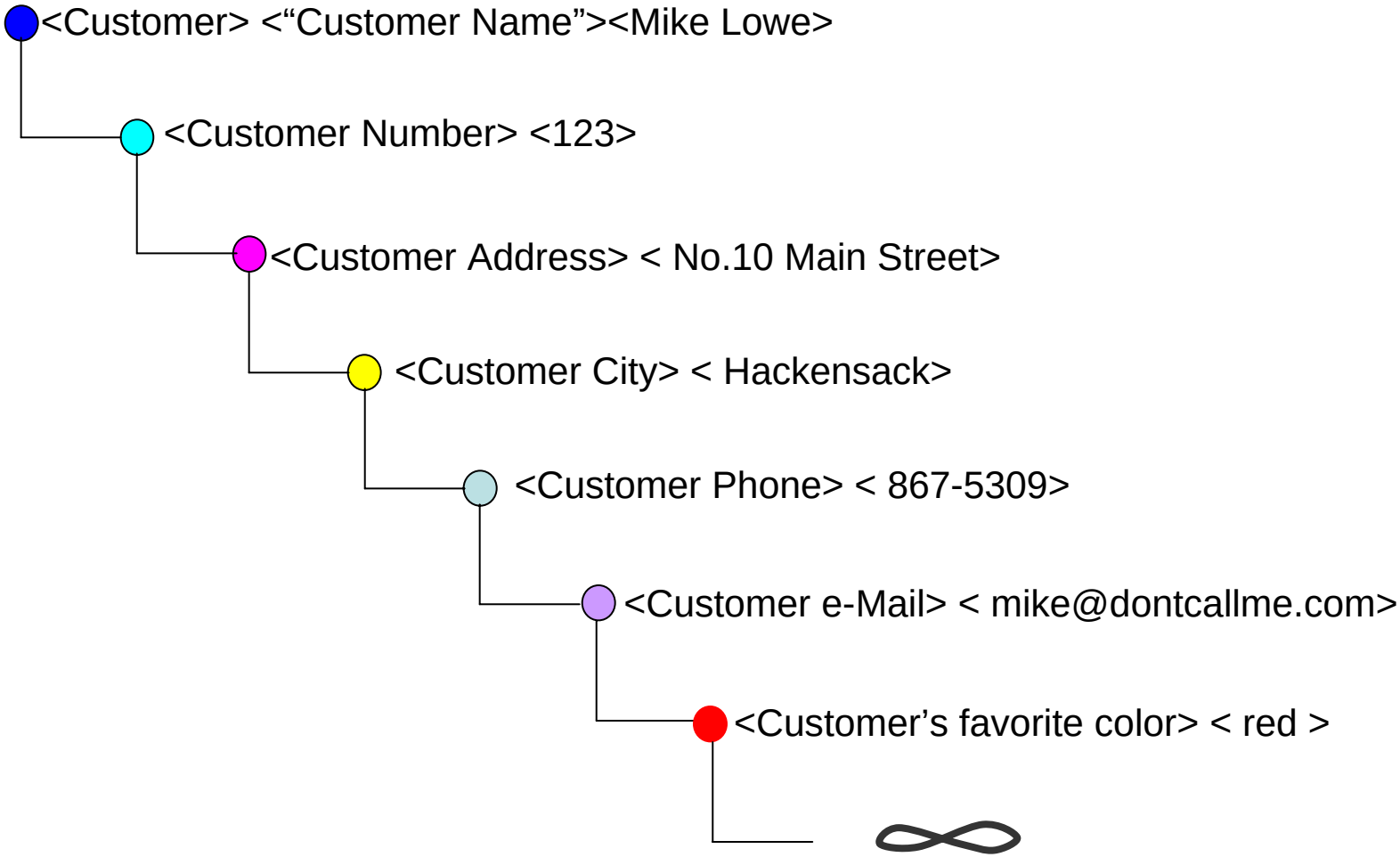
That allow for user-defined Name-alias’

<Customer> <AKA “Customer Name”>

and user-defined look-up “values”

<Mike Lowe>, <Bill Moore>

Catalog nouns are “recursive”



Recursion allows for unlimited “extensibility” –(No need to ask a committee)– and it provides human readability within a single standard XSD schema (together with standard parent noun definitions)

Noun recursion in data collection is a very powerful concept:

Unlimited recursive nouns point at their parent object ID's

(Parent nouns point at Null Objects)

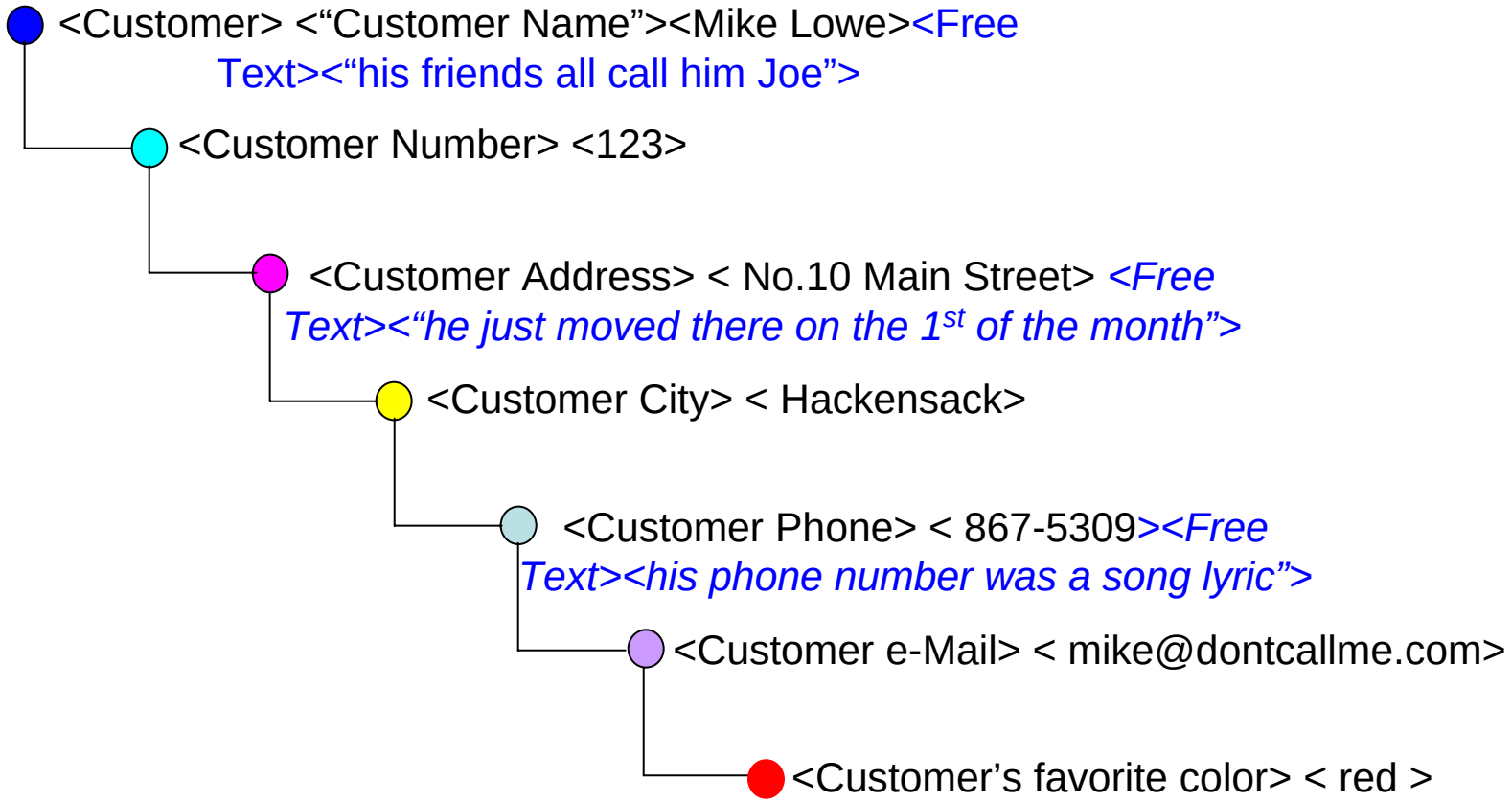
Object ID	Noun Name	Parent Object ID
0	Customer Name	null
1	Customer Number	0
2	Customer Address	1
3	Customer City	2
4	Customer Phone	3
5	Customer e-Mail	4
6	Customer FavoriteColor	5

Each Catalog noun can have unlimited values

Customer Name	Customer Number	Customer Address	Customer City	Customer Phone	Customer e-Mail	Customer FavoriteColor
Mike Lowe	123	10 Main Street	Hackensack	8675309	mike@dontcallme.com	red
Bill Moore	222	290 Elm Street	Paris	999-1111	bill@chargeme.com	green
Frank Smith	333	99 River Road	Rome	111-9999	frank@comp.com	blue
Martha Brown	444	100 Dusty Trail	Dodge City	123-4567	brown@email.com	brown

Problem: Free text remarks could come into play anywhere.

Solution: Allow for them EVERYwhere.

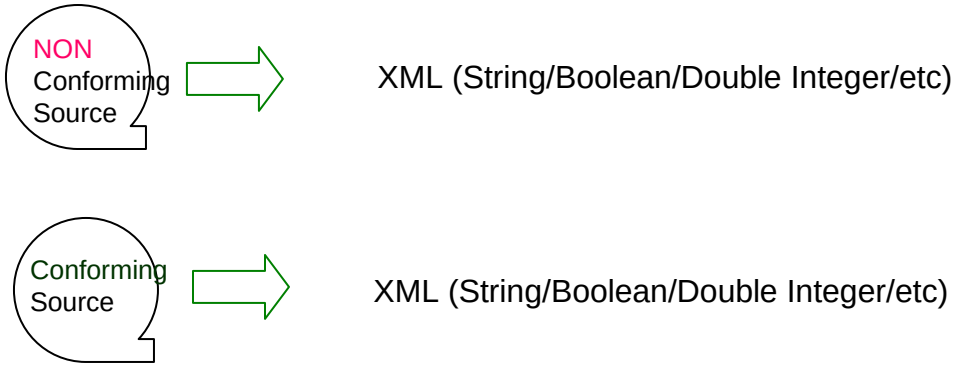


Problem: How to handle non-conforming primitive data types in nonconforming data sources (eg; 1.7E-308; 17°,30’,59’’, Tuesday, 8:30PM)

Solution: Adopt open (string) data types (as the “universal recipient”)

. . . And allow integrators to select predefined recommended primitive data types (eg; Dates, Measured Values)

Ensures measurements flow from the source seamlessly



Data Dictionary Statistics

Read-across mapping of all data elements currently supporting tens of thousands of customers.

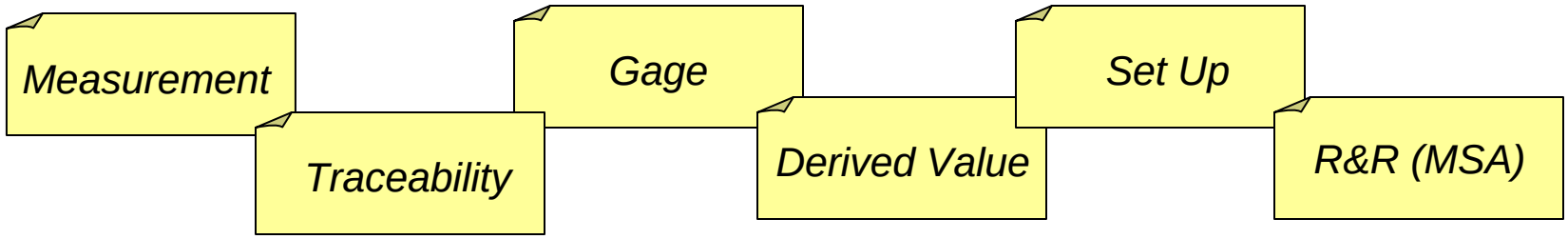
- Major consolidation into 5 Conformance Classes with just 23 Nouns
- Six Distinct Catalogs, with approx ~10 nouns in each

Five Conformance Classes

23 nouns

Basic measurement	Basic SPC	SPC with traceability	Enhanced reporting elements/expanded traceability	Attachments & Language
ONE	**TWO**	**THREE**	**FOUR**	**FIVE**
Characteristic ID	Date Time	Characteristic Class	Event	File Attachment
Measured Value	Lower Tolerance Limit	Characteristic Description	Nonconformance	Language
Product ID	Nominal Value	Free Text	Reason for Test	
	Sample ID	Gage ID		
	Subgroup Size	Machine ID		
	Upper Tolerance Limit	Operator		
		Plant		
		Study Type		
		Unit		

6 Generic Catalog types . . .



Benefits derived from the Quality Measurement Standard :

1. Eliminates wasted resource, money and time in data integration tasks.
2. Redirects these savings to value-added activities, enhancements, etc.
3. Allows Solutions Providers and Gage manufacturers to redirect more energy on new development.
4. Gages suddenly can communicate with more Reporting tools, making gages more useful.
5. Reporting tools can accept data from more sources, making reporting tools more useful.
6. Customers reap the benefits to focus more on core business.
7. Allows almost everybody to claim conformance to at least one AIAG conformance Class !
8. Sparks new competition among providers, to ascend to the next Conformance Class, and to provide more complete catalogs - generally raising the bar for industry.
9. Ensures that customers know what they will receive when their gage or reporter states “AIAG Conformance Class 3 + Catalogs A, B, and Z” .
10. Maps to any legacy database schema (by merit of mix and match, dropping unwanted nouns, and allowing catalogs / data elements to associate alternatively to headers /measurements or footers.
11. Utilizes standard identifiable tags, yet allows customers to retain old familiar names.
12. Moves away from Gage dependencies and proprietary schemas that require separate technical support.

Next Steps:

1. Noun Consolidation -Now / April 06
2. Complete XSD March - April 06
3. Create Parser March - April 06
4. Testing (internal) - April 06
5. Public exposure /demos - June 06
6. Documentation for Standard - May /June 06
7. Stage Parser - July 06
8. Test module construction July / Aug 06
9. User testing (external) - Aug 06
10. Final ISO Noun Harmonization – Sept 06
11. Rollout - Sept 06
12. User feedback

AIAG

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